

## PROGRAM OVERVIEW

# Standards Correlations

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Each lesson in this *Integrated Pathway: Mathematics II* program was written specifically to address the Common Core State Standards. Each lesson lists the standards covered in all the sub-lessons, and each sub-lesson lists the standards addressed in that particular section. In this section, you'll find a comprehensive list mapping the sub-lessons to the CCSS.

## Guide to Common Core State Standards Annotation

As you use this program, you will come across a symbol included with the Common Core standards for some of the lessons and activities. These symbols are explained below.

### **Symbol: ★**

#### **Denotes: Modeling Standards**

Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★).

From <http://www.walch.com/CCSS/00003>

### **Symbol: (+)**

#### **Denotes: College and Career Readiness Standards**

Advanced mathematics standards that are required in higher-level courses such as advanced statistics may also be included in lower-level courses. These additional standards are denoted by (+). According to the Common Core State Standards Initiative, “the evidence concerning college and career readiness shows clearly that the knowledge, skills, and practices important for readiness include a great deal of mathematics prior to the boundary defined by (+) symbols in these standards. Indeed, some of the highest priority content for college and career readiness comes from Grades 6–8.”

From <http://www.walch.com/CCSS/00004>

## **Connections to Future Courses**

This section provides a map between topics introduced in each unit of this course and subsequent courses where each topic is revisited and built upon.

## CCSS INTEGRATED PATHWAY: MATHEMATICS II STANDARDS CORRELATIONS

## Unit 1: Extending the Number System

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Working with the Number System</b>		
	1.1.1	Defining, Rewriting, and Evaluating Rational Exponents	N–RN.1 N–RN.2
	1.1.2	Rational and Irrational Numbers and Their Properties	N–RN.2 N–RN.3
<b>Lesson 2</b>	<b>Operating with Polynomials</b>		
	1.2.1	Adding and Subtracting Polynomials	A–APR.1
	1.2.2	Multiplying Polynomials	A–APR.1
<b>Lesson 3</b>	<b>Operating with Complex Numbers</b>		
	1.3.1	Defining Complex Numbers, $i$ , and $i^2$	N–CN.1
	1.3.2	Adding and Subtracting Complex Numbers	N–CN.2
	1.3.3	Multiplying Complex Numbers	N–CN.2

## CCSS INTEGRATED PATHWAY: MATHEMATICS II STANDARDS CORRELATIONS

## Unit 2: Quadratic Functions and Modeling

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Analyzing Quadratic Functions</b>		
	2.1.1	Graphing Quadratic Functions	F-IF.7a★
	2.1.2	Interpreting Various Forms of Quadratic Functions	F-IF.7a★ F-IF.8a
<b>Lesson 2</b>	<b>Interpreting Quadratic Functions</b>		
	2.2.1	Interpreting Key Features of Quadratic Functions	F-IF.4★
	2.2.2	Identifying the Domain of a Quadratic Function	F-IF.5★
	2.2.3	Identifying the Average Rate of Change	F-IF.6★
<b>Lesson 3</b>	<b>Building Functions</b>		
	2.3.1	Building Functions from Context	F-BF.1a★
	2.3.2	Operating on Functions	F-BF.1b★
<b>Lesson 4</b>	<b>Graphing Other Functions</b>		
	2.4.1	Square Root and Cube Root Functions	F-IF.7b★
	2.4.2	Absolute Value and Step Functions	F-IF.7b★
	2.4.3	Piecewise Functions	F-IF.7b★
<b>Lesson 5</b>	<b>Analyzing Functions</b>		
	2.5.1	Analyzing Exponential Functions	F-IF.8b
	2.5.2	Comparing Properties of Functions Given in Different Forms	F-IF.9 F-LE.3★
<b>Lesson 6</b>	<b>Transforming Functions</b>		
	2.6.1	Replacing $f(x)$ with $f(x) + k$ and $f(x + k)$	F-BF.3
	2.6.2	Replacing $f(x)$ with $k \cdot f(x)$ and $f(k \cdot x)$	F-BF.3
<b>Lesson 7</b>	<b>Finding Inverse Functions</b>		
	2.7.1	Finding Inverse Functions	F-BF.4a

## CCSS INTEGRATED PATHWAY: MATHEMATICS II STANDARDS CORRELATIONS

Unit 3: Expressions and Equations			
Lesson	Sub-lesson number	Title	Standard(s)
Lesson 1	<b>Interpreting Structure in Expressions</b>		
	3.1.1	Identifying Terms, Factors, and Coefficients	A–SSE.1a★
	3.1.2	Interpreting Complicated Expressions	A–SSE.1b★
Lesson 2	<b>Creating and Solving Quadratic Equations in One Variable</b>		
	3.2.1	Taking the Square Root of Both Sides	A–CED.1★ A–REI.4b
	3.2.2	Factoring Expressions by the Greatest Common Factor	A–SSE.2
	3.2.3	Factoring Expressions with $a = 1$	A–SSE.2
	3.2.4	Factoring Expressions with $a > 1$	A–SSE.2
	3.2.5	Solving Quadratic Equations by Factoring	A–SSE.2 A–CED.1★ A–REI.4b
	3.2.6	Completing the Square	A–SSE.2 A–CED.1★ A–REI.4a A–REI.4b
	3.2.7	Applying the Quadratic Formula	A–CED.1★ A–REI.4a A–REI.4b
	3.2.8	Solving Quadratic Inequalities	A–SSE.2 A–CED.1★ A–REI.4b

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 3</b>	<b>Creating Quadratic Equations in Two or More Variables</b>		
	3.3.1	Creating and Graphing Equations Using Standard Form	A–SSE.3a★ A–CED.2★
	3.3.2	Creating and Graphing Equations Using the $x$ -intercepts	A–SSE.3a★ A–CED.2★
	3.3.3	Creating and Graphing Equations Using Vertex Form	A–SSE.3b★ A–CED.2★
	3.3.4	Rearranging Formulas	A–CED.4★
<b>Lesson 4</b>	<b>Fundamental Theorem of Algebra</b>		
	3.4.1	Extending Polynomial Identities to Include Complex Numbers	N–CN.8 (+)
	3.4.2	Solving Quadratic Equations with Complex Solutions	N–CN.7 N–CN.9 (+)
<b>Lesson 5</b>	<b>Rational Equations</b>		
	3.5.1	Creating Rational Equations	A–CED.1★
	3.5.2	Graphing Rational Equations	A–CED.2★
	3.5.3	Creating Rational Inequalities	A–CED.1★
<b>Lesson 6</b>	<b>Writing Exponential Expressions in Equivalent Forms</b>		
	3.6.1	Writing Exponential Expressions in Equivalent Forms	A–SSE.3c★
<b>Lesson 7</b>	<b>Solving Systems of Equations</b>		
	3.7.1	Solving Systems Graphically	A–REI.7
	3.7.2	Solving Systems Algebraically	A–REI.7

## CCSS INTEGRATED PATHWAY: MATHEMATICS II STANDARDS CORRELATIONS

Unit 4: Applications of Probability			
Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Events</b>		
	4.1.1	Describing Events	S-CP.1★
	4.1.2	The Addition Rule	S-CP.7★
	4.1.3	Understanding Independent Events	S-CP.2★
<b>Lesson 2</b>	<b>Conditional Probability</b>		
	4.2.1	Introducing Conditional Probability	S-CP.3★ S-CP.5★ S-CP.6★
	4.2.2	Using Two-Way Frequency Tables	S-CP.4★ S-CP.5★ S-CP.6★
	4.2.3	The Multiplication Rule	S-CP.8★ (+)
<b>Lesson 3</b>	<b>Combinatorics</b>		
	4.3.1	Combinations and Permutations	S-CP.9★ (+)
	4.3.2	Probability with Combinatorics	S-CP.9★ (+)
<b>Lesson 4</b>	<b>Making and Analyzing Decisions</b>		
	4.4.1	Making Decisions	S-MD.6★ (+)
	4.4.2	Analyzing Decisions	S-MD.7★ (+)

## CCSS INTEGRATED PATHWAY: MATHEMATICS II STANDARDS CORRELATIONS

Unit 5: Similarity, Right Triangle Trigonometry, and Proof			
Lesson	Sub-lesson number	Title	Standard(s)
Lesson 1	<b>Line Segments</b>		
	5.1.1	Midpoints and Other Points on Line Segments	G–GPE.6
Lesson 2	<b>Investigating Properties of Dilations</b>		
	5.2.1	Investigating Properties of Parallelism and the Center	G–SRT.1a
	5.2.2	Investigating Scale Factors	G–SRT.1b
Lesson 3	<b>Defining and Applying Similarity</b>		
	5.3.1	Defining Similarity	G–SRT.2
	5.3.2	Applying Similarity Using the Angle-Angle (AA) Criterion	G–SRT.3
Lesson 4	<b>Proving Similarity</b>		
	5.4.1	Proving Triangle Similarity Using Side-Angle-Side (SAS) and Side-Side-Side (SSS) Similarity	G–SRT.4
	5.4.2	Working with Ratio Segments	G–SRT.4
	5.4.3	Proving the Pythagorean Theorem Using Similarity	G–SRT.4
	5.4.4	Solving Problems Using Similarity and Congruence	G–SRT.5
Lesson 5	<b>Proving Theorems About Lines and Angles</b>		
	5.5.1	Proving the Vertical Angles Theorem	G–CO.9
	5.5.2	Proving Theorems About Angles in Parallel Lines Cut by a Transversal	G–CO.9
Lesson 6	<b>Proving Theorems About Triangles</b>		
	5.6.1	Proving the Interior Angle Sum Theorem	G–CO.10
	5.6.2	Proving Theorems About Isosceles Triangles	G–CO.10
	5.6.3	Proving the Midsegment of a Triangle	G–CO.10
	5.6.4	Proving Centers of Triangles	G–CO.10

Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 7</b>	<b>Proving Theorems About Parallelograms</b>		
	5.7.1	Proving Properties of Parallelograms	G-CO.11
	5.7.2	Proving Properties of Special Quadrilaterals	G-CO.11
<b>Lesson 8</b>	<b>Exploring Trigonometric Ratios</b>		
	5.8.1	Defining Trigonometric Ratios	G-SRT.6
	5.8.2	Exploring Sine and Cosine As Complements	G-SRT.7
<b>Lesson 9</b>	<b>Applying Trigonometric Ratios</b>		
	5.9.1	Calculating Sine, Cosine, and Tangent	G-SRT.8★
	5.9.2	Calculating Cosecant, Secant, and Cotangent	G-SRT.8★
	5.9.3	Problem Solving with the Pythagorean Theorem and Trigonometry	G-SRT.8★
	5.9.4	Proving the Fundamental Pythagorean Identity	F-TF.8

## CCSS INTEGRATED PATHWAY: MATHEMATICS II STANDARDS CORRELATIONS

Unit 6: Circles With and Without Coordinates			
Lesson	Sub-lesson number	Title	Standard(s)
<b>Lesson 1</b>	<b>Introducing Circles</b>		
	6.1.1	Similar Circles and Central and Inscribed Angles	G–C.1 G–C.2
	6.1.2	Chord Central Angles Conjecture	G–C.2
	6.1.3	Properties of Tangents of a Circle	G–C.2
<b>Lesson 2</b>	<b>Inscribed Polygons and Circumscribed Triangles</b>		
	6.2.1	Constructing Inscribed Circles	G–C.3
	6.2.2	Constructing Circumscribed Circles	G–C.3
	6.2.3	Proving Properties of Inscribed Quadrilaterals	G–C.3
<b>Lesson 3</b>	<b>Constructing Tangent Lines</b>		
	6.3.1	Constructing Tangent Lines	G–C.4 (+)
<b>Lesson 4</b>	<b>Finding Arc Lengths and Areas of Sectors</b>		
	6.4.1	Defining Radians	G–C.5
	6.4.2	Deriving the Formula for the Area of a Sector	G–C.5
<b>Lesson 5</b>	<b>Explaining and Applying Area and Volume Formulas</b>		
	6.5.1	Circumference and Area of a Circle	G–GMD.1
	6.5.2	Volumes of Cylinders, Pyramids, Cones, and Spheres	G–GMD.1 G–GMD.3★
<b>Lesson 6</b>	<b>Deriving Equations</b>		
	6.6.1	Deriving the Equation of a Circle	G–GPE.1
	6.6.2	Deriving the Equation of a Parabola	G–GPE.2
<b>Lesson 7</b>	<b>Using Coordinates to Prove Geometric Theorems About Circles and Parabolas</b>		
	6.7.1	Using Coordinates to Prove Geometric Theorems About Circles and Parabolas	G–GPE.4

**TOPICS FROM FUTURE COURSES: CCSS INTEGRATED PATHWAY MATHEMATICS II**

<b>Math II</b>	<b>Topic introduced</b>	<b>Course/unit where addressed</b>	<b>How addressed</b>
<b>Unit 1</b>	Extending the number system to include rational exponents	Math III Unit 4A	applied to properties of logarithms
		Math III Unit 4B	extended to real-world modeling
	Operating with polynomials	Math III Unit 4B	combining functions
	Complex numbers	Math III Unit 4B	using complex numbers in graphing rational functions
Math IV		dividing complex numbers, operating and representing complex numbers geometrically in the coordinate plane, and representing and operating with vectors	
<b>Unit 2</b>	Quadratic functions for analyzing, solving, and transforming square root, cube root, and absolute value functions	Math III Units 3, 4A, and 4B	extended to rational, logarithmic, periodic, and polynomial functions
		Math III Unit 4A	finding inverses for other function families
	Inverse functions	Math IV	composing functions and verifying inverses

**TOPICS FROM FUTURE COURSES: CCSS INTEGRATED PATHWAY MATHEMATICS II**

<b>Math II</b>	<b>Topic introduced</b>	<b>Course/unit where addressed</b>	<b>How addressed</b>
<b>Unit 3</b>	Interpreting the structures of quadratic expressions	Math III Unit 2A	interpreting higher-order polynomials
		Math III Unit 2B	interpreting rational expressions
	Quadratic and rational functions in standard form	Math III Unit 2A	applied to polynomial equations in standard form
	Using the Fundamental Theorem of Algebra in solving quadratic equations	Math III Unit 2A	using the Fundamental Theorem of Algebra to solve polynomials of higher degree
	Graphing rational equations	Math III Unit 4B	modeling real-world situations
	Exponential equations including rational exponents and more complex equations in equivalent form	Math IV	graphing logarithmic functions
	Linear-quadratic systems	Math III Unit 2A	applied to linear-rational, linear-polynomial, polynomial-polynomial, and absolute value-polynomial systems
		Math III Unit 2B	extended to linear-rational and linear-radical systems
		Math IV	applied to $3 \times 3$ and larger systems of equations using vectors and matrices
	Graphing simple rational functions	Math III Unit 2B	solving rational equations
Math IV		graphing more complex rational functions and exploring features of the graphs	

**TOPICS FROM FUTURE COURSES: CCSS INTEGRATED PATHWAY MATHEMATICS II**

<b>Math II</b>	<b>Topic introduced</b>	<b>Course/unit where addressed</b>	<b>How addressed</b>
<b>Unit 4</b>	Probability	Math III Unit 1	applied to inferences and decision-making in statistics
<b>Unit 5</b>	Similarity, special angle pairs formed by parallel lines cut by a transversal and other angle pairs, the properties of triangles and special triangles, and parallelograms	Math III Unit 4B	using planes to create two-dimensional figures and slice three-dimensional objects
	Trigonometric ratios and proofs of trigonometric identities	Math III Unit 3	proving and applying the laws of sines and cosines, studying periodic phenomena, and modeling using trigonometric functions
		Math IV	graphing the sine and cosine functions and representing and operating with vectors; extended to complex trigonometric identities
<b>Unit 6</b>	Circles, their properties, and special segments	Math IV	using formulas for the volumes of spheres and other solids
	Deriving the formulas for a circle and a parabola	Math IV	expanded to working with equations of other conic sections